

**OCCUPATIONAL SAFETY  
AND HEALTH STANDARDS BOARD**

2520 Venture Oaks, Suite 350  
Sacramento, CA 95833  
(916) 274-5721  
FAX (916) 274-5743  
[www.dir.ca.gov/oshsb](http://www.dir.ca.gov/oshsb)



NOTICE OF PROPOSED MODIFICATION TO  
CALIFORNIA CODE OF REGULATIONS

Chapter 4, Subchapter 4, Article 29,  
Sections 1714 and 1715 of the Construction Safety Orders

**Precast Concrete Construction**

Pursuant to Government Code Section 11346.8(c), the Occupational Safety and Health Standards Board (Standards Board) gives notice of the opportunity to submit written comments on the above-named regulations in which further modifications are being considered as a result of public comments and/or Board staff evaluation.

On October 19, 2000, the Standards Board held a Public Hearing to consider revisions to Title 8, Sections 1714 and 1715 of the Construction Safety Orders, California Code of Regulations. The Standards Board received oral comments on the proposed revisions. The regulations have been further modified as a result of these comments, written comments and Board consideration.

A copy of the full text of the regulation as originally proposed, and a copy of the modified text clearly indicating the further modifications, is attached for your information. In addition, a summary of all oral and written comments regarding the original proposal and staff responses is included. Any written comments on these modifications must be received by 5:00 p.m. on May 4, 2001 at the Occupational Safety and Health Standards Board, 2520 Venture Oaks Way, Suite 350, Sacramento, California 95833. These regulations will be scheduled for adoption at a future business meeting of the Standards Board.

Pursuant to Government Code Section 11346.8(d), notice is also given of the opportunity to submit comments concerning the addition to the rulemaking file of the following document and/or information:

- California Business and Professions Code, Sections 6731, 6734, 6735, and 6736.

The Standards Board's rulemaking files on the proposed action are open to public inspection Monday through Friday, from 8:00 a.m. to 4:30 p.m., at the Standards Board's office at 2520 Venture Oaks Way, Suite 350, Sacramento, California.

Inquiries concerning the proposed changes may be directed to the Executive Officer, John D. MacLeod at (916) 274-5721.

Date: April 17, 2001

OCCUPATIONAL SAFETY AND HEALTH  
STANDARDS BOARD

## **REGULATIONS AS ORIGINALLY PROPOSED**

**STANDARDS PRESENTATION**  
**TO**  
**CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD**

Attachment No. 1

Page 1 of 2

PROPOSED STATE STANDARD,  
TITLE 8, CHAPTER 4

§1714. Hoisting and Erecting of Precast, Prefabricated Panels (Other Than Tilt-Up).

(a) An erection plan and procedure shall be prepared by a civil engineer currently registered in California (the responsible engineer).

(1) The erection plan and procedure shall be available at the job site.

(2) Job site inspections shall be made by the responsible engineer (or an authorized representative) during the course of erection to ensure that the erection plan and procedures are followed.

(3) Any proposed field modifications shall be approved by the responsible engineer and added to the plan and procedure available at the job site.

(4) Precast wall or vertical panel bracing shall be designed by, and installed in accordance with the direction of, the responsible engineer.

(5) Lifting methods and procedures shall be such that employees are not at risk of being struck by the panel or other supporting equipment.

~~(b) All attachments shown on the erection plan shall be installed before the panel lifting load line is released.~~ Lifting inserts embedded or otherwise attached to precast concrete members shall be capable of supporting at least four times the maximum intended load.

(c) Lifting hardware shall be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware.

(d) Precast concrete wall units and structural framing shall be supported to prevent overturning and collapse until permanent connections are completed.

(e) (e) Adjustment of panels, after initial placement, which requires the lifting of the panel in any manner shall not be made unless wire rope safety tie backs are used or the panels are reattached to a load line.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

§1715. ~~Precast Tilt-Up Concrete Panel Construction, Including Tilt-Up.~~

(a) Concrete erection stresses, lifting point attachments and locations in tilt-up concrete panels shall be designed by a currently registered civil engineer for expected loads, including impact.

(b) Lifting inserts which are embedded or otherwise attached to tilt-up precast concrete members, ~~other than the tilt-up members,~~ shall be capable of supporting at least ~~four~~ two times the maximum intended load ~~applied or transmitted to them.~~

(c) Lifting hardware shall be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware.

(d) ~~Precast wall or V~~vertical panel bracing used to support the tilt-up panels prior to final bolting/attachment shall be designed by, and installed in accordance with the direction of, a currently registered civil engineer. The bracing shall be designed to withstand, at a minimum, a wind load induced force of a 70 mile per hour wind. ~~of at least 10 pounds per square foot. (See Appendix Plate B-5).~~

(1) Prior to the commencement of panel erection, a detailed lifting plan shall be prepared by a currently registered civil engineer. All panel erection shall be performed in accordance with the plan.

(2) Lifting methods and procedures shall be such that employees are not at risk ~~conducted in such a manner as to ensure that in the event of lifting attachment failure, employees shall not be exposed to the hazard~~ of being struck by the panel or other supporting equipment.

**STANDARDS PRESENTATION**  
**TO**  
**CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD**

Attachment No. 1

Page 2 of 2

PROPOSED STATE STANDARD,  
TITLE 8, CHAPTER 4

(3) The lifting plans and procedures shall be available on the job site.

(4) Field modifications to the lifting plan shall be approved by a currently registered civil engineer and added to the plans and procedures available at the job site.

(e) Tilt-up wall panels shall be supported to prevent overturning, toppling and/or collapse until permanent connections are completed.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**PROPOSED MODIFICATIONS**  
(**Modifications are indicated in bold by  
underscore for new language and  
strikeout for deleted language.**)

**STANDARDS PRESENTATION**  
**TO**  
**CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD**

Attachment No. 1

Page 1 of 2

PROPOSED STATE STANDARD,  
TITLE 8, CHAPTER 4

**Amend CSO Section 1714 as follows:**

§1714. Hoisting and Erecting ~~of~~ Precast, Prefabricated ~~Panels~~ **Concrete Construction** (~~Other Than Tilt-Up Panels~~).

(a) An erection plan and procedure shall be prepared by, **or under the direction of,** a civil engineer currently registered in California (**hereinafter referred to as the responsible engineer**).

(1) The erection plan and procedure shall be available at the job site.

(2) Job site inspections shall be made by the responsible engineer, ~~for an authorized representative,~~ during the course of erection to ensure that the erection plan and procedures are followed.

(3) Any proposed field modifications shall be approved by the responsible engineer and added to the plan and procedure available at the job site.

(4) Precast **wall member** or vertical panel bracing shall be designed by, **or under the direction of,** and installed in accordance with the direction of, the responsible engineer.

(5) Lifting methods and procedures shall be such that employees are not at risk of being struck by the **concrete member,** panel or ~~other~~ supporting equipment.

(b) ~~All attachments shown on the erection plan shall be installed before the panel lifting load line is released.~~ Lifting inserts, **which are embedded or otherwise attached to precast concrete members, shall be capable of supporting at least four times the maximum intended load applied or transmitted to them, and shall be used in accordance with the manufacturer's recommendations.**

(c) Lifting hardware shall be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware.

(d) Precast concrete **wall-units members** and structural framing shall be supported to prevent **falling,** overturning and collapse until **the permanent connections specified in the erection plan** are completed.

(e) ~~(e)~~ Adjustment of **panels precast members,** after initial placement, which requires the lifting of the **panel members** in any manner, shall not be made unless wire rope safety tie backs are used or the **panels members** are reattached to a load line.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

**Amend CSO Section 1715 as follows:**

§1715. Precast Tilt-Up Concrete Panel Construction,~~Including Tilt-Up.~~

(a) Concrete erection stresses, lifting point attachments and locations in tilt-up concrete panels shall be designed **for expected loads, including impact,** by, **or under the direction of,** a **civil engineer** currently registered **in California (hereinafter referred to as the responsible engineer)** ~~civil engineer for expected loads, including impact.~~

(b) Lifting inserts, which are embedded or otherwise attached to ~~tilt-up precast concrete members, other than the tilt-up members,~~ shall be capable of supporting at least ~~four~~ **two** times the maximum intended load **applied or transmitted to them, and shall be used in accordance with the manufacturer's recommendations.**

**STANDARDS PRESENTATION**  
**TO**  
**CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD**

Attachment No. 1

Page 2 of 2

PROPOSED STATE STANDARD,  
TITLE 8, CHAPTER 4

(c) Lifting hardware shall be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware.

(d) ~~Precast wall or V~~vertical panel bracing used to support the tilt-up panels prior to final bolting/attachment shall be designed by, or under the direction of, and installed in accordance with the direction of, **the responsible engineer, a currently registered civil engineer.**

**(1) The B**bracing shall be designed to withstand, at a minimum, a wind load induced force of a 70 mile per hour wind. ~~of at least 10 pounds per square foot. (See Appendix Plate B-5).~~

**(2) (1)** Prior to the commencement of panel erection, ~~a~~ detailed lifting **and erection plans** shall be prepared by, **or under the direction of, the responsible engineer a currently registered civil engineer.** All panel erection shall be performed in accordance with the plan.

(3) The lifting **and erection plans and procedures** shall be available on the job site.

(4) Field modifications to the lifting plan shall be approved by **the responsible engineer a currently registered civil engineer** and added to the plans and procedures available at the job site.

**(5) (2)** Lifting methods and procedures shall be such that employees are not at risk ~~conducted in such a manner as to ensure that in the event of lifting attachment failure, employees shall not be exposed to the hazard~~ of being struck by the panel or ~~other~~ supporting equipment.

(e) Tilt-up wall panels shall be supported to prevent overturning, toppling and/or collapse until permanent connections are completed **as specified in the erection plan.**

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

## **SUMMARY AND RESPONSE TO COMMENTS**



## **SUMMARY AND RESPONSE TO ORAL AND WRITTEN COMMENTS**

### **I. Written Comments**

Dr. John Howard, Chief, Division of Occupational Safety and Health (Division), by letter dated September 6, 2000.

#### **Comment No. 1:**

The Division recommends changing the title of Section 1714 as follows (using strike-out and underline to show proposed changes):

Hoisting and Erecting ~~of~~ Precast, Prefabricated ~~Panels~~ **Concrete Construction**  
(~~Other Than Tilt-up Panels~~).

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

#### **Response:**

The Board agrees that this proposed modification to the regulation is necessary to make it clear that the regulations include not only precast panels, but also any other precast construction such as ornamentation, concrete bents, and other concrete shapes. The title of Section 1714 will be revised.

#### **Comment No. 2:**

The Division recommends changing references from the "responsible engineer" to read: "civil engineer." This recommendation applies to Sections 1714(a)(2), 1714(a)(3) and 1714(a)(4). The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

#### **Response:**

Board staff agrees that the clarification of the role of the engineer in the preparation of the erection plan and procedure is necessary. The original proposal uses the term "the responsible engineer" in Section 1714(a) to refer to "a civil engineer currently registered in California." Board staff is of the opinion that use of the term "the responsible engineer" is less cumbersome than repeating the requirement for a licensed civil engineer in several sections.

#### **Comment No. 3:**

The Division recommends deleting parentheses around "or an authorized representative" in Section 1714(a)(2).

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff agrees that this proposed modification is necessary to clarify that the responsible engineer may delegate job site inspections to an authorized representative. The parentheses have been replaced with commas around the phrase "or an authorized representative."

Comment No. 4:

The Division recommends revising Board staff's proposed Section 1714(b) as follows (underlines and strike-outs are used to show the Division proposed changes to the Board staff's initial proposal):

Lifting inserts, embedded or otherwise attached ~~to~~, used in precast concrete elements or precast, prestressed concrete members shall ~~be capable of supporting at least~~ have a minimum safety factor of four times the ~~maximum~~ intended load, and shall be used in accordance with the manufacturer's recommendations.

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff notes that any changes proposed to this section must be at least as effective as 29 CFR 1926.704(c) that it parallels. Therefore, Board staff agrees that the Division's proposed changes are necessary where they provide equal or superior safety to that required by Federal OSHA. Board staff also finds it necessary to modify the proposal to include additional Federal language "applied or transmitted to them" in order to assure that the proposal will provide a level of safety equal or superior to that required by Federal OSHA. Therefore, Board staff proposes to modify Section 1714(b) as follows:

Lifting inserts, **which are** embedded or otherwise attached to precast concrete members, shall be capable of supporting at least four times the maximum intended load **applied or transmitted to them**, and shall be used in accordance with the manufacturer's recommendations.

Additionally, Board staff proposes to modify the corresponding Section 1715(b) (tilt-up construction) in a similar manner as follows:

Lifting inserts, which are embedded or otherwise attached to ~~tilt-up precast concrete members, other than tilt-up members~~, shall be capable of supporting at least ~~four~~ two times the maximum intended load **applied or transmitted to them** and shall be used in accordance with the manufacturer's recommendations.

Comment No. 5:

The Division recommends revising Board staff's proposed Section 1714(c) as follows (underlines and strike-outs are used to show the Division proposed changes to the Board staff's initial proposal):

Lifting hardware shall be capable of supporting ~~at least five times~~ the maximum intended imposed load ~~applied or transmitted to the lifting hardware~~ with a safety factor of five.

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff notes that the current proposal is verbatim of 29 CFR 1926.704(d). Therefore, the main difference between the Division's proposal and Federal OSHA is the use of "imposed" versus "intended" load and "safety factor of five" versus "at least five times." Since "intended" is used elsewhere in Section 1714, and since it is consistent with Federal OSHA, Board staff believes it would be best to maintain the current proposed regulatory language. Staff also proposes to continue using "at least five times" for consistency with Federal OSHA.

Comment No. 6:

The Division recommends adding a new paragraph as follows:

**Bracing for precast wall units or vertical panels shall be installed in accordance with the erection plan and procedure required by subparagraph (a).**

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

It appears that the Division's comment may have been based on an earlier draft of the proposed changes. This section was revised prior to public notice. This requirement is now essentially contained in Sections 1714(a)(2) and (4), and it is therefore unnecessary to duplicate it. Board staff does not find a necessity for this proposed change.

Comment No. 7:

The Board staff initially proposed to delete the original Section 1714(b) and to replace it with a new Section 1714(d) as follows:

**Precast concrete wall units and structural framing shall be supported to prevent overturning and collapse until permanent connections are completed.**

The Division recommends retaining requirements of the existing Section 1714(b) with one modification as follows:

All attachments shown on the erection plan shall be installed before the **panel** lifting load line is released.

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff notes that the proposed Section 1714(d) is nearly verbatim of 29 CFR 1926.704(a); however, Board staff agrees with the Division's proposal to the extent that it proposes to combine the Division's recommended changes for 1714(b) and (d) into the following revision to make requirements for precast concrete members consistent with those for tilt-up concrete [Section 1715(e) as revised by Comment No. 10]. Board staff proposes to amend Section 1714(d) as follows:

(d) Precast concrete wall units and structural framing shall be supported to prevent overturning and collapse until **the permanent connections specified in the erection plan** are completed.

Note: Additional changes are proposed by Comment No. 8, below.

Comment No. 8:

The Division recommends revising proposed Section 1714(d) as follows:

(d) Precast concrete ~~wall units and elements~~, precast prestressed concrete and structural framing shall be supported to prevent **falling**, overturning and collapse until permanent connections are completed.

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff agrees that the proposed modifications are necessary to the extent that Section 1714(d) (also modified by Comment No. 7) be further modified as follows:

(d) Precast concrete ~~wall units~~ **members** and structural framing shall be supported to prevent **falling**, overturning and collapse until **the permanent connections specified in the erection plan** are completed.

Comment No. 9:

The Division recommends replacing the term "panels" with "elements" in Section 1714(e) which is more inclusive.

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff agrees with the Division that it is necessary to include construction requirements for all precast members, not just for wall panels. (See Response to Comment No. 1). However, Board staff has noted that Federal OSHA uses the term "members" rather than "elements" and staff is of the opinion that the use of the term "members" is more inclusive. Therefore, staff proposes to amend Section 1714 as follows:

(a)(4) Precast ~~wall member~~ or vertical panel bracing shall be designed by, and installed in accordance with the direction of, the responsible engineer.

(a)(5) Lifting methods and procedures shall be such that employees are not at risk of being struck by the ~~concrete member~~, panel or ~~other~~ supporting equipment.

(e) Adjustment of ~~panels~~ **precast members**, after initial placement, which requires the lifting of the **panel members** in any manner, shall not be made unless wire rope safety tie backs are used or the **panels members** are reattached to a load line.

Additionally, Board staff proposes the following clarification to Section 1715(d)(5) to make regulations for tilt-up construction consistent with those for precast concrete construction [Section 1714(a)(5)]:

Lifting methods and procedures shall be such that employees are not at risk of being struck by the panel or ~~other~~ supporting equipment.

Comment No. 10:

The Division recommends clarifying Section 1715(e) as follows:

Tilt-up wall panels shall be supported to prevent overturning, toppling and/or collapse **prior to release of the lifting load line** until permanent connections are completed **as specified in the erection plan**.

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff agrees that a portion of the proposed changes are necessary for clarity and for consistency with industry practices; however, Board staff does not support inclusion of the clause "prior to release of the lifting load line" as this is not consistent with industry practices. Industry practice is to raise the tilt-up panel and to attach temporary bracing. Once temporary bracing is attached, the lifting load line is normally detached and the crane moves on to the next

lift. Therefore, Board staff supports the Division's recommendations to the extent that Section 1715(e) be revised as follows:

Tilt-up wall panels shall be supported to prevent overturning, toppling and/or collapse until permanent connections are completed **as specified in the erection plan.**

Comment No. 11:

The Division recommends clarifying Section 1715 with a subsection addressing procedures for adjustment of panels after initial placement as follows:

Adjustment of panels, after initial placement, which requires the lifting of the panel in any manner shall not be made unless the panels are reattached to the load line.

The purpose and necessity given by the Division for this proposed change is to clarify existing safety orders and to conform to current building standards and industry practices.

Response:

Board staff agrees with the intent of the proposed change. However, Board staff finds the condition that lifting lines be required only "when lifting the panel in any manner" to be problematic. In a fatal construction accident in Southern California in 1999, a contractor argued that he had been incorrectly cited because he claimed he was not lifting the panel after initial placement, but was only skidding the base of the panel using a hydraulic jack and crowbar. In this accident, the panel became unbalanced and the weight of the panel overcame the temporary bracing when the bottom of the panel was skidded approximately 4" after placement of temporary bracing and the removal of the lifting line. Board staff believes that Section 1715(e) as revised by Comment No. 10 addresses the issues more broadly than the Division's recommendation and will cover the issues involved in the 1999 fatal accident more thoroughly so that no further changes are necessary.

The Board thanks Dr. John Howard and the Division of Occupational Safety and Health for their participation in the Standards Board's rulemaking process.

II. Oral Comments

Oral comments received at the October 19, 2000, Public Hearing

Mr. Richard Warner, representing Southern California Edison.

Comment No. 1:

Mr. Warner stated that, based on the language used in Section 1714(a), he did not know how one could consider "the responsible engineer" to be a civil engineer. Mr. Warner also commented that the language of Section 1714(a) appeared to require the design and erection plan to be prepared by the same individual. Mr. Warner stated that he believes that a lot of these designs

are prepared by those other than engineers, but that they are always approved by engineers. Mr. Warner believes that it is important that the language be clarified to address the issue that the design does not have to be prepared by an engineer provided that it is prepared under the direction of a registered engineer.

Response:

Board staff agrees with Mr. Warner that there is ambiguity in Section 1714(a) and finds it necessary to clarify that "the responsible engineer" is a civil engineer currently registered in California and that the plans may be designed by, or under the direction of, the responsible engineer. Board staff is of the opinion that these modifications are necessary to clarify the role and responsibility of the engineer in the design of the erection plan and procedure.

Comment No. 2:

Mr. Warner stated that he believes that many precast erection designs are prepared by individuals other than engineers, but that they are always approved by engineers. Mr. Warner recommended that Section 1714(a)(4) be modified to read (underlines and strike-outs indicate changes proposed):

The design of Pprecast walls or vertical panel bracing shall be approved ~~designed~~ by, and installed in accordance with the directions ~~of, the responsible engineer~~ approved by a civil engineer registered in the State of California.

Response:

Board staff agrees with Mr. Warner that clarification of Section 1714(a)(4) is necessary for consistency with the Business and Professions Code and with industry practices. Board staff proposes the following modification in response to Mr. Warner's comment:

(4) Precast wall or vertical panel bracing shall be designed by, or under the direction of, and installed in accordance with the direction of, the responsible engineer.

Comment No. 3:

Mr. Warner commented that Section 1715(d) should be changed to "shall be approved by, and installed in accordance with the directions that are approved by an engineer currently registered in California."

Response:

This comment concerning Section 1715 (tilt-up construction) addresses the same concern as for Comment No. 1 which concerned Section 1714 (pre-cast, prefabricated concrete construction). Board staff agrees with Mr. Warner and finds it necessary to modify Section 1715(d) as follows:

- 1715(d) ~~Precast wall or V~~vertical panel bracing used to support the tilt-up panels prior to final bolting/attachment shall be designed by, or under the direction of, and installed in

accordance with the direction of, **the responsible engineer. a currently registered civil engineer.**

- 1715(d)(2) Prior to the commencement of panel erection, a detailed lifting plan shall be prepared by **or under the direction of the responsible engineer a currently registered civil engineer.** All panel erection shall be performed in accordance with the plan.
- 1715(d)(4) Field modifications to the lifting plan shall be approved by the responsible engineer a currently registered civil engineer and added to the plans and procedures available at the job site.

Comment No. 4:

Mr. Warner commented that Section 1715(d)(4) should be clarified to require that the engineer approving field modifications must be a civil engineer currently registered in California.

Response:

Board staff agrees with Mr. Warner and is of the opinion that his concerns have been addressed by our responses to his Oral Comments numbers 1 and 3 (above).

The Board thanks Mr. Warner for his participation in the Standards Board's rulemaking process.